REMARKS

Favorable reconsideration of this application in light of the following discussion is respectfully requested.

Claims 1-2 are presently active in this case. The present Amendment amends Claims 1 and 2 without introducing any new matter and cancels Claims 3-10.

The outstanding Office Action rejected Claims 1-3, 5-8 and 10 under 35 U.S.C. §102(b) as anticipated by Yu (U.S. Patent No. 5,818,902). Claims 4 and 9 were rejected under 35 U.S.C. §103(a) as unpatentable over Yu in view of Pugachev et al. (U.S. Patent Publication No. 2002/0051513, herein "Pugachev").

First, Applicants wishes to thank the Examiner Sharon for the courtesy of an interview granted to Applicants' representative on May 12, 2005, at which time the outstanding issues in this case were discussed.

To correct minor informalities and to clarify Applicants' invention, independent Claim 1 is amended to delete the reference numerals. Since these chances are supported by the Specification as originally filed or are only of clerical nature, they are not believed to raise any question of new matter.

To clarify Applicants' invention, Claims 1 and 2 are amended. Claim 1 is amended to recite additional features regarding the simulation means and the radiation treatment planning means.[1] Claim 2 is amended to be in independent form by reciting "a radiation treatment plan making method" and is further amended to recite similar features of amended Claim 1. Since the new claims find non-limiting support in the disclosure as originally filed, they are not believed to raise a question of new matter.[2]

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[1] Finds non-limiting support in Applicants' Specification from page 16, line 22 to page 17, line 31 and from page 18, line 19 to page 19, line 22 and in corresponding Figure 3.

[2] See MPEP 2163.06 stating that "information contained in any one of the specification, claims or drawings of the application as filed may be added to any other part of the application without introducing new matter."

In view of the amendments to Claims 1-2, it is believed that the rejection of Claims 1-3, 5-8 and 10 under 35 U.S.C. §102(b) over Yu is overcome. Applicants respectfully request reconsideration of this rejection and traverse the rejection, as discussed next.

Briefly recapitulating, Applicants' Claim 1 relates a radiation treatment system including: simulation means for executing radiation treatment simulation for dividing a radiation exposure region and a peripheral region thereof to be irradiated with particle beams into a plurality of unit radiation exposure regions, and then applying particle beams according to a shape of each divided unit radiation exposure region; and radiation treatment planning means for obtaining a radiation treatment condition for causing flatness, which is a degree of uniformly irradiating the radiation exposure region with a proper dose of particle beams, to be in a desired range, and a dose of particle beams applied to the unit radiation exposure region of the peripheral region to be minimized, in the case where the simulation means executes the radiation treatment simulation, and then making a radiation treatment plan reflecting the radiation treatment condition, wherein the simulation means divides the radiation exposure region and the peripheral region thereof into unit radiation exposure regions of grid forms whose size is set according to a radiation beam size that is decided by an operation condition, which decides the flatness, of the radiation treatment apparatus, and performs radiation treatment simulation that simulates operation for applying radiation treatment for the unit radiation exposure regions with a pitch of one half of one side of the grid as a step size, and wherein the radiation treatment planning means determines a degree of contribution made by a dose of radiation on the flatness of radiation exposure region at the unit radiation exposure region simulated on the peripheral region based on the dose of radiation at the radiation beam size simulated by the radiation treatment simulation, and based on the result of this determination, the radiation treatment planning means obtains an operation condition for the radiation treatment apparatus as the radiation treatment condition

in which the peripheral regions that satisfy the desired flatness in the radiation exposure region, and whose number of grid becomes minimum to obtain the flatness. Claim 2 recites similar features in the context of a radiation treatment plan making method.

As explained in Applicants' Specification at page 1, lines 4-16 with related Figure 7, Applicants' invention improves upon background radiation treatment systems because it irradiates an area to be treated with an uniform radiation beam, while thereby improving the efficiency of the radiation utilization. The claimed invention thus leads to improved radiation treatment systems.[3]

Turning now to the applied references, the Yu patent discloses a method and apparatus for delivering optimized treatment plans with arbitrary two-dimensional beam distribution to deliver relatively high doses of ionization radiation to target tissues.[4] However, Yu fails to teach or suggest the claimed radiation treatment condition for causing flatness, which is a degree of uniformly irradiating the radiation exposure region to be in a desired range over the radiation exposure region. Yu teaches in an Example 1 that a phantom made of plastic material was used to perform an intensity modulated arc therapy[5] and that the beam intensity distributions required to deliver the prescribed dose constraints to the target for optimized treatment.[6] However, the beam intensity distribution is not flat or uniformly distributed, as can be seen in Yu's Figures 6, 8a, 8b, 9b and 10b. Further, Yu teaches that calculated dose-volume histograms illustrate the intensities limited to five levels and then ten levels.[7] Yu further explicitly teaches ***a number of intensity levels are required*** and the complexity of the intensity distributions dictates the number of superimposing arcs[8] and therefore teaches away from the claimed invention.

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[3] See Applicants' Specification at page 8, lines 10-21.
[4] See Yu in the Abstract.
[5] See Yu at column 12, lines 41-45.
[6] See Yu from column 12, line 66 to column 13, line 2 and in Figure 6.
[7] See Yu at column 13, lines 52-55.
[8] See Yu at column 7, lines 28-45.

Furthermore, Applicants respectfully submit that Yu is silent on the claimed simulation means dividing the radiation exposure region and the peripheral region thereof into unit radiation exposure regions of grid forms whose size is set according to a radiation beam size that is decided by an operation condition, which decides the flatness. Yu merely teaches that virtually any desired field shape can be achieved in radiation therapy.[9]

Therefore, it is believed that the applied reference Yu fails to teach or suggest every feature recited in Applicants' claims, so that Claims 1-2 are patentably distinct over the applied references. Accordingly, Applicants respectfully traverse, and request reconsideration of, the rejection based on Yu.[10]

Further, Pugachev was filed at the U.S. P.T.O on September 25, 2001 and was published on May 2, 2002. However, Applicants U.S. filing date is July 16, 2001 and therefore antedates the filing and the publication date of Pugachev, and thus Pugachev is not properly applied against the present application. Therefore, it is respectfully requested that the Pugachev reference be withdrawn from consideration.

Consequently, in view of the present Amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal Allowance. A Notice of Allowance for Claims 1-2 is earnestly solicited.

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[9] See Yu at column 6, lines 16-27.

[10] See MPEP 2131: "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference," (Citations omitted) (emphasis added). See also MPEP 2143.03: "All words in a claim must be considered in judging the patentability of that claim against the prior art."

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicants' undersigned representative at the below listed telephone number.

Respectfully submitted,

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